

ABSTRACT

In the present study, the crude extracts of different plant parts were investigated to ascertain their yield, stability, physical condition, phytochemical and physiochemical properties, antimicrobial activities, antioxidant capacity, *R_f* values by TLC technique heavy metal detection, HPLC analysis and their applications.

In case of yield, *Beta vulgaris* and *Daucus carota* showed highest yield of 38.92% and 40.83%, while *Beta vulgaris* leaves showed the lowest yield of 10.45%. The samples were placed at four different temperatures to determine their stability by physiochemical analysis. Low fat percentage was observed in almost all samples, ranging from 0.01% to 0.49%. The highest value of fat content was found in extracts of *Capsicum annum* (0.49%) fresh sample while it was lowest in *Beta vulgaris* (0.01%) in incubator. The plants samples investigated for protein showed the highest protein percentage at room temperature in the extracts of *Brassica campestris* (0.78%) and the lowest in *Daucus carota* (0.02%) placed in incubator. For ash content, a wide range was observed from 0.02% to 36.73%. The highest values were observed in samples of *Beta vulgaris* leaves (36.73%) and the lowest values *Daucus carota* (7.24%) kept at room temperature and freezer respectively. The carbohydrate content was found highest in fresh leaf extract of *Beta vulgaris* (33%), while it was the lowest in the sample of *Daucus carota* (0.8%) kept in freezer. The highest and lowest moisture percentage was noted in same sample placed at different conditions. *Brassica campestris* leaf extract placed in freezer showed the highest value (55.9%), while it was lowest in the same sample placed in incubator (1.10%).

The plant samples, inspected for antibacterial and antifungal activity, showed different zones of inhibition. For the estimation of antibacterial potential four bacterial strains (*Escherchia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Bacillus subtilis*) and three solvents (water, ethanol and methanol) were used. Against *Escherchia coli*, the leaf extracts showed a range of 10.3 mm to 26 mm by *Beta vulgaris* using ethanol and *Brassica oleracea* var. *capitata* using water, respectively. In case of *Pseudomonas aeruginosa* the range of 12.6 mm to 24.6 mm was documented. Highest zone was shown by *Citrus sinensis* (24.6 mm) using methanol and lowest by *Beta vulgaris* leaves (7.8 mm) using water, among all the tested samples. However, a range of 8.83 mm to 23 mm was noted against *Staphylococcus aureus*. *Brassica oleracea* var. *capitata* displayed maximum (23 mm) and *Beta vulgaris* leaves demonstrated minimum (8.83 mm) antibacterial potential

by using water as solvent in both cases. However, a good response was noted against *Bacillus subtilis*. Moreover, maximum antibacterial potential was noted in root extracts of *Beta vulgaris* (25 mm) using ethanol and minimum in *Brassica oleracea* var. *capitata* (9.0 mm) using ethanol.

Similarly, the aqueous and ethanolic plant extracts were tested for antifungal potential as well. All the samples were evaluated against two fungal strains: *Aspergillus niger* and *Fusarium solani*. Against *Aspergillus niger*, the highest activity was displayed by aqueous extract of *Capsicum annum* (40.3 mm) and the lowest by ethanolic extract of *Daucus carota* (15 mm) among all the tested samples. Against *Fusarium solani*, the highest activity was shown by ethanolic extract of *Daucus carota* (70 mm), and the lowest by aqueous extracts of *Brassica campestris* (14.8 mm) among all the tested samples. Thus, the plant extracts were more active against *Fusarium solani* (14.8 mm to 70 mm) as compared to *Aspergillus niger* (15 mm to 40.3 mm).

The plant samples also investigated for their antioxidant potential. At 500 concentration ($\mu\text{g/mL}$) of plant extract, the highest DPPH action was displayed by *Brassica campestris* (90.59) and lowest by *Citrus sinensis* (68.07). When scrutinized for IC_{50} values, the highest value was shown by *Daucus carota* (39.42%) and lowest by *Brassica campestris* (12.13%) among all the samples. In case of total antioxidant activity by phosphomolybdenum scheme, a wide range (i.e. 5.42 to 117.3 AAC $\mu\text{g/mL}$) was observed. The highest value was recorded in *Citrus sinensis* (117.3 AAC $\mu\text{g/mL}$), while the lowest revealed by *Daucus carota* (5.42 AAC $\mu\text{g/mL}$). The plant extracts were also analyzed for their total phenolic contents (TPC). Among all the samples, the highest TPC was found in *Beta vulgaris* (143.6 GAC $\mu\text{g/mL}$) and the lowest in *Brassica campestris* (2.7 GAC $\mu\text{g/mL}$). The Plant extracts were also evaluated for percentage inhibition of peroxidation (IP%) by Ferric thiocyanate (FTC) assay. The results revealed that the highest IP value was displayed in *Beta vulgaris* leaves (47.7%) and the lowest by *Capsicum annum* (25.9%). Plant extracts were also investigated for their total flavonoid contents (TFC). Among all the samples, *Beta vulgaris* showed the highest value (55.5 RE $\mu\text{g/mL}$), and *Citrus sinensis* showed the lowest (9.6 RE $\mu\text{g/mL}$). Furthermore, the analysis of percentage inhibition of ferrozine- Fe^{2+} complex by metal chelating activity exhibited a good range of 31.9 to 89.5% among all the samples. The highest activity was displayed by *Capsicum annum* (89.5%) and the lowest activity revealed by *Daucus carota* (31.9 %).